REMARKS

Upon entry of the instant Response and Amendment, Claims 1-16, 18, 19, 33 and 34 will remain pending in this application.

In the Office Action mailed November 21, 2006, Claims 20-31 are rejected under 35 U.S.C. §102(b), as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,077,978 issued to McDaniel et al. Claims 1-10, 13-16, 18-31, 33, and 34 are rejected under 35 U.S.C. §102(b), as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et al. Claims 1-16, 18, 19, 33 and 34 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,077,978 issued to McDaniel et al. Claims 11 and 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et al. in view of U.S. Pat. No. 6,077,978 issued to McDaniel et al. Claims 1-16, 18-31, 33, and 34 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Rejections under 35 U.S.C. §112, second paragraph

Claims 1-16, 18-31, 33, and 34 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 20-31 have been cancelled, thus obviating any grounds for rejection based upon those claims. The Examiner contends at page 10 of the instant Office Action, that "[a]ll of the pending claims feature a molecular weight range of from about 260 Da to about 2,500 Da; however, it is not immediately clear if this range is describing a number average molecular weight or a weight average molecular weight."

Applicant has amended independent Claims 1 and 33 to specify that the molecular weights are number averaged molecular weights, support for such amendment being found at page 6, line 31 to page 7, line 2 of the instant Specification. Applicant submits that because of those changes, Claims 1-16, 18, 19, 33, and 34 are in compliance with 35 U.S.C. §112, second paragraph, and respectfully request the Examiner reconsider and reverse his rejection of those claims under 35 U.S.C. §112, second paragraph, as being indefinite.

Rejections under 35 U.S.C. §§102(b)/103(a) as anticipated and/or rendered obvious by McDaniel et al.

Claims 20-31 stand rejected under 35 U.S.C. §102(b), as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,077,978 issued to McDaniel et al. Beginning at page 5, paragraph numbered 7 of the instant Office Action, the Examiner states,

> *Regarding claims 20-31*, the teachings of McDaniel et al. are as set forth above and incorporated herein. It should be noted that claims 20-31 are product-by-process claims. It has been found that "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process," - *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).
>
> In light of this, the product of McDaniel et al. appears to be the same or an obvious product of the product set forth in the instant claims, so long as enough acid is supplied to prevent catalyst deactivation. By doing so, the product is produced without increasing the amount of high molecular weight tail or increasing polydispersity (see column 5. lines 3-9).
>
> In addition, it should be noted that if these obvious amounts of acid were used in the process of McDaniel et al. one of ordinary skill in the art would have expected to yield the same molecular weight ranges set forth in claim (***20***) (*of about 260 Da to about 2.500 Da*). The use of these obvious amounts would yield the same or an obvious process of the one set forth in the claims. This same or obvious process would be expected to inherently produce the same or obvious results.

Although Applicant respectfully disagrees with the Examiner's contention regarding McDaniel et al. reproduced above, in the interests of advancing prosecution of the instant application, Claims 20-31 have been cancelled without prejudice, thus obviating any grounds for rejection based upon those claims.

Rejections under 35 U.S.C. §§102(b)/103(a) as anticipated and/or rendered obvious by O'Connor et al.

Claims 1-10, 13-16, 18-31, 33, and 34 stand rejected under 35 U.S.C. §102(b), as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et al. Claims

20-31 have been cancelled, thus obviating any grounds for rejection based upon those claims Beginning at page 6, paragraph numbered 8 of the instant Office Action, the Examiner states,

> *Regarding claims 1, 5-10, 13-16, 18 and 19*, O'Connor et al. disclose: (I) a process for the polyoxyalkylation of a starter (Abstract; column 1, lines 5- 18), comprising:
>
> (a) establishing oxyalkylation conditions in an oxyalkylation reactor in the presence of a DMC catalyst (Abstract; column 14, line 15 through column 15, line 62; Examples);
>
> (b) continuously introducing into the reactor at least one alkylene oxide and a low molecular weight starter (Abstract; column 3, line 58 through column 6, line 2) acidified with at least one of an inorganic protic mineral acid and an organic acid, wherein the acid comprises greater than about 100 ppm, based on the weight of the starter (column 10, lines 57-64; Examples); (***5***) wherein the acid is chosen from *see claim for list* (column 10, lines 57-64; Examples); (***6***) wherein the acid is chosen from *see claim for list* (column 10, lines 57-64; Examples); (***7***) wherein the acid is phosphoric acid (column 1.0, lines 57-64; Examples); (***8***) wherein the acid comprises greater than about 100 ppm to about 2,000 ppm, based on the weight of the starter (column 10, lines 57-64; Examples); (***9***) wherein the acid comprises about 200 ppm to about 300 ppm, based on the weight of the starter (column 10, lines 57-64; Examples); (***10***) wherein the reactor is a continuous reactor (column 14, line 15 through column 15, line 62); (***13***) wherein the continuous reactor comprises a back-mixed reactor (column 14, line 15 through column 15, line 62); (***14***) wherein the DMC catalyst is zinc hexacyanocobaltate (column 12, line 43 through column 13, line 30 - *see referenced documents in this passage*); (***15***) wherein the alkylene oxide is see claim for list (Abstract; column 3, line 58 through column 6, line 2; Examples); (***16***) wherein the alkylene oxide is propylene oxide (Abstract; column 3, line 58 through column 6, line 2); (***18***) wherein the process is continuous (column 14, line 15 through column 15, line 62); and (***19***) wherein the process is semi-batch (column 14, line 15 through column 15, line 62).
>
> O'Connor et al. disclose, "These polyols can range in molecular weight from 300 to 30,000," (*see column 13, line 55 through column 14, line 14*); however, they do not explicitly disclose the claimed molecular weight range of about 260 Da to about 2,500 Da.

Firstly, it has been found that when a claimed range, "overlap(s) or lie(s) inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists - *see MPEP 2144.05*. Secondly, it should be noted that the O'Connor et al. reference satisfies all of the process limitations set forth in the instant claims. In light of this, one of ordinary skill in the art would have expected to inherently produce the same or obvious results from the same or obvious process.

Therefore, the teachings of O'Connor et al. would have inherently or obviously satisfied the instant invention because they disclose the same process limitations set forth in the instant claims, wherein one of ordinary skill in the art would have expected to inherently produce the same or obvious results from the same or obvious process. Furthermore, they disclose a molecular weight range that overlaps the molecular weight range set forth in the instant claims.

Regarding claims 2-4, the starter materials set forth in the claims are recognized as nonpreferred materials in O'Connor et al - *see column 10; lines 30-38; column 11, lines 44-55*. However, it has been found that, "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain," -*In re Heck*, 699 F.2d 1331, 1332-33,216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). *See*: *MPEP 2123*.

Therefore, the limitations of claims 2-4 are obviously or inherently satisfied because O'Connor et al. consider these starter materials as non-preferred embodiments.

Regarding claims 20-31, 33, and 34, the teachings of O'Connor et al. are as set forth above and incorporated herein to satisfy the limitations of claims 20-31, 33, and 34.

Applicant respectfully disagrees with the Examiner's contention regarding O'Connor et al. and remind the Examiner that as stated in MPEP §2131, to anticipate a claim, a reference must teach every element of that claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ...claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). Applicant respectfully contends that the Examiner has failed to point to where O'Connor et al. do so.

Further, as stated in MPEP §2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, citing *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992).

Applicant notes that all of the examples provided by O'Connor et al. apply to processes that are not commercially viable. O'Connor et al. use ratios of propylene oxide to starter in the range of >1 to about 10, whereas commercially viable processes use ratios in the range of about .05 to 0.2. O'Connor et al. allude to the use of some special reactor that may be useful for their process as a starter reactor but do not describe this reactor. As those skilled in the art are aware, the problem with such a high ratio is that once the system activates, the propylene oxide generates about 7-8°C exotherm for each one percent oxide in the reactor.

Thus, if a ratio of 0.1 (10%) is used one would expect a potential temperature increase in the range of 70-80°C. If one were to use a ratio of 1.0 (50%) PO, the exotherm would be in the range of about 350°C to about 400°C above the starting temperature of the reactor. As those skilled in the art are aware, at temperatures greater than about 320°C, the polyol would start to exothermically decompose into smaller molecules creating pressure sufficient to rupture the reactor. O'Connor et al. note the issue of high temperature in their small reactor at the same time it was operating in an unsafe condition. In the small reactor, the reactor mass to heat-evolved is sufficient to allow operation outside of the safety envelope of commercial systems. The commercial systems are sufficiently large as to behave like adiabatic reactors and thus the potential for heat evolution must be more carefully controlled. Because O'Connor et al. were operating in a nonviable region, it is difficult to draw any useful conclusions based on the data given in their patent. One can hypothesize about phosphoric acid neutralization as used by O'Connor et al. at the high oxide dilution levels; however, there is no data that will allow one to extrapolate to commercially viable systems.

Further, at col. 7, lines 15-20, O'Connor et al. state that it is not possible to use glycerin with their invention, whereas the instantly claimed invention provides a useful process for the production of polyols using glycerin. O'Connor et al. devised a procedure to allow the use of many starters with their dilution of the starter with very high levels of alkylene oxide. Unfortunately, the method of using PO at very high levels is inherently unsafe and can only be practiced in very small reactors with high cooling capability and then only with significant safety risk. In contradistinction, the instantly claimed invention is directed to a procedure that will allow the use of glycerin and other starters having hydroxyl groups in close proximity to be used in a commercially viable process.

Therefore, Applicant respectfully requests the Examiner reconsider and reverse his rejection of Claims 1-10, 13-16, 18, 19, 33, and 34 under 35 U.S.C. §102(b), as being anticipated by, or in the alternative under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et al.

Rejections under 35 U.S.C. §103(a) as rendered obvious by McDaniel et al.

Claims 1-16, 18, 19, 33 and 34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,077,978 issued to McDaniel et al. Beginning at page 2, paragraph numbered 4 of the instant Office Action, the Examiner states,

> *Regarding claims 1-16, 18, and 19*, McDaniel et al. disclose an almost identical process to claim (***1***) (Abstract; column 6, lines 48-58); wherein the starters of claims (***2-4***) are used (column 5, lines 25-39; column 7, lines 7-20); wherein the acids of claims (***5-7***) are used (column 6, lines 3-23); wherein the continuous reactor/conditions of claims (***10-13***) are used (column 7, lines 21-55); wherein the catalyst of claim (***14***) is used (Examples); wherein the alkylene oxide of claims (***15-16***) are used (Examples); wherein the approximate molecular weight range of claim (***1***) is produced (Examples); (***18***) wherein the process is continuous (column 7, lines 21-55); and (***19***) wherein the process is semi-batch (column 7, lines 21-55).

The teachings of McDaniel are deficient in that they fail to explicitly disclose the use of: (***1***) greater than about 100 ppm of acid; (***8***) greater than about 100 ppm to about 2,000 ppm of acid; and (***9***) about 200 ppm to about 300 ppm of acid, all based on the weight of the starter. McDaniel discloses, "*In general*, less than 100 ppm acid based on total low molecular weight starter need to be added," (column 6, lines 55-58).

McDaniel et al. establish that this concentration is a result-effective variable, wherein a minimum is required to prevent de-activation of the DMC catalyst (column 5, lines 3-24). Their general teaching of less than 100 ppm is open to possible ranges above 100 ppm. Furthermore, applicant fails to show criticality for the lower end-points of the claimed ranges.

In light of this, it has been found that, "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation," - *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); and, "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation," - *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the acid concentration in the process of McDaniel et al. because McDaniel et al. establish that this concentration is a result-effective variable, wherein a minimum is required to prevent de-activation of the DMC catalyst. Furthermore, applicant fails to demonstrate criticality for the claimed ranges.

Further with respect to the range of claim (***1***), the claimed range of greater than *about 100* ppm potentially overlaps or touches the disclosed range of less than 100 ppm because *about 100* ppm includes values below 100 ppm. Even if these ranges do not touch or overlap, it has been found that a prima facie case of obviousness exists where, "the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties," - *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of "having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.3 1% molybdenum, balance titanium.).

In addition, it should be noted that if these obvious amounts of acid were used in the process of McDaniel et al, one of ordinary skill in the art would have expected to yield the same molecular weight ranges set

forth in claim (*1*) (*of about 260 Da to about 2,500 Da*). The use of these obvious amounts would yield the same or an obvious process of the one set forth in the claims. This same or obvious process would be expected to inherently produce the same or obvious results.

Regarding claims 33 and 34, the teachings of McDaniel et al. are as set forth above and incorporated herein to satisfy the limitations of claims 33 and 34.

Applicant disagrees with the Examiner's contention regarding McDaniel et al. and respectfully remind the Examiner of the Federal Circuit's admonition given against hindsight reconstruction in *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1458-9 (Fed. Cir. 1998) that, "...the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." Applicant respectfully contends that the Examiner has failed to do so in the instant Office Action.

McDaniel et al. demonstrate that the addition of acid neutralizes alkaline residues and aids in the production of polyols based on glycerin and other starters. They nowhere state or suggest that the addition of acid beyond that required for neutralization provides any benefit. Based upon the example of the instant application, it appears that there is a synergism between the DMC catalyst and the excess acid addition ~~acid addition~~. The 60 ppm of acid added in the control is more than sufficient to neutralize the basic components in glycerin; however, the process fails in the production of a 700 MW polyol. The higher level of acid appears to offset the presence of water in the glycerin and/or to offset the problem normally associated with starters having multiple hydroxyl groups in close proximity. (*See* col. 7 lines 15-20 of O'Connor et al.)

Therefore, Applicant contends that nothing in the teaching of McDaniel et al. would lead one of ordinary skill in the art to the instantly claimed invention and respectfully request the Examiner reconsider and reverse his rejection of Claims 1-16, 18, 19, 33 and 34 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,077,978 issued to McDaniel et al.

Rejections under 35 U.S.C. §103(a) as rendered obvious by O'Connor et a1. in view of McDaniel et al.

Claims 11 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et a1. in view of U.S. Pat. No. 6,077,978 issued to McDaniel et al. Beginning at page 8, paragraph numbered 9 of the instant Office Action, the Examiner states,

> The teachings of both O'Connor et al. and McDaniel et al. are as set forth above and incorporated herein. The teachings of O'Connor et al. disclose a continuous reaction; however, they fail to explicitly disclose: (*11*) the use of a tubular reactor; and (*12*) the use of multi-point addition for introducing the reactants.
>
> The analogous nature of these two references is readily established in light of the prior art rejections set forth above. In light of this, the teachings of McDaniel et al. establish that these limitations are recognized in the art as suitable reactors and feed techniques (see column 7, lines 21 -55) for this type of continuous reaction.
>
> Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a tubular reactor and multi-point addition, as taught by McDaniel et al., in the process of O'Connor et al. because the teachings of McDaniel et al. establish that these limitations are recognized in the art at suitable reactors and feed techniques for this type of continuous reaction.

Applicant's comments with respect to the deficiencies of O'Connor et al. and McDaniel et al. have been noted` above and will not be repeated here in the interests of conserving time. O'Connor et al. fail to teach or suggest the instantly claimed invention. McDaniel et al. fail to provide the missing teaching or suggestion that would lead one of ordinary skill in the art to the instantly claimed invention.

Therefore, Applicant contends that nothing in the combined teaching of the cited art would lead one of ordinary skill in the art to the instantly claimed invention and respectfully request the Examiner reconsider and reverse his rejection of Claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,359,101 issued to O'Connor et a1. in view of U.S. Pat. No. 6,077,978 issued to McDaniel et al.

Conclusion

Applicant has amended Claims 1, 8 and 33 and have cancelled Claims 20-31 without prejudice. Such claim amendments add no new matter and find support in the specification.

Applicant submits that the instant application is in condition for allowance. Accordingly, reconsideration and a Notice of Allowance are respectfully requested for Claims 1-16, 18, 19, 33 and 34. If the Examiner is of the opinion that the instant application is in condition for other than allowance, he is invited to contact the Applicant's attorney at the telephone number listed below, so that additional changes to the claims may be discussed.

Respectfully submitted,

By _____

John E. Mrozinski, Jr.
Attorney for Applicant
Reg. No. 46,179

Bayer MaterialScience LLC
100 Bayer Road
Pittsburgh, Pennsylvania 15205-9741
(412) 777-3024
FACSIMILE PHONE NUMBER:
(412) 777-3902
s:\shared\kgb\8155respJEM